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REMARKS

Claims 1-22 are pending in the present application. In the Office Action mailed April 7, 2004, the Examiner rejected claim 4 under 35 U.S.C. §112, second paragraph, as being indefinite. The Examiner next rejected claims 1, 5-6, and 9-10 under 35 U.S.C. §103(a) as being unpatentable over Donnart et al. (USP 6,008,464) in view of Brunner et al. (USP 6,570,132). Claims 2-4 and 11-22 were rejected under 35 U.S.C. §103(a) as being unpatentable over Donnart et al. in view of Brunner et al. and further in view of Schutz (UPS 5,912,471). The Examiner indicated that claims 7 and 8 contain allowable subject matter – such indication is appreciated.

The Examiner rejected claim 4 under 35 U.S.C. §112, second paragraph, as being indefinite. Applicant has amended claim 4 and claim 16 to correct typographical errors.

In rejecting claim 1, the Examiner stated that "Donnart et al. teach the claimed subject ma[t]ter except for showing use of a single communication link to both control and power the torch using a serializing system located in the torch." The Examiner then cited Brunner et al. for the proposition that "it is conventional to use a single communication line... to effectuate both control and powering of the torch." However, the Examiner did not establish any teaching or suggestion to modify the art of record so as to render all the elements of claim 1 obvious, and that the art of record falls drastically short of teaching or suggesting that which is claimed.

Applicant respectfully believes that the Examiner's rejection is incomplete. The Examiner's statement that "Donnart et al. teach the claimed subject ma[t]ter except for showing use of a communication link to both control and power the torch using a serializing system located in the torch" is conclusory and does not satisfy the requirements of MPEP §2142 and MPEP §706.02(j). Should another action be deemed necessary, Applicant requests citations to the reference to support this conclusion.

Claim 1 calls for a plasma cutting system comprised of a plasma torch operationally connected to a power source, with a serialization circuit disposed within the torch to control feedback signals from the torch to the power source. Donnart et al. teaches a plasma cutting system comprised of a plasma torch operationally connected to a power source, a fluid source, a gas or air circuit, a control "robot", and various sensing units. Donnart et al. does not satisfy claim 1 because it does not mention any specific system, method, or means of communication between the sensors and the control "robot" whatsoever. Donnart et al. concerns merely how to determine when and what adjustments are needed to control torch power, outside environment temperature, water coolant resistivity, and tank pressure. While claim 1 calls for a "serialization circuit disposed within the plasma torch to control transmission of multiple feedback signals from

the plasma torch to the plasma cutting power source," Donnart et al. does not teach or suggest any circuit to control transmission of signals from the sensors to the power source. Therefore, contrary to the Examiner's statement, Donnart et al. does not teach all the express elements of claim 1.

The Examiner acknowledged that Donnart et al. fails to teach or suggest a serialized link to both control and power the torch. Accordingly, the Examiner cited Brunner et al. as teaching a single communication line to effect control and powering of the torch. However, the Examiner did not provide any reason to modify the system of Donnart et al. to include a serialization circuit to control transmission of feedback signals. Donnart et al. teaches that all sensors be disposed outside of the plasma cutter. Brunner et al. teaches a single serial link between a power source and a remote control unit. Therefore, modification of Donnart et al. to include a serialization circuit, as taught by Brunner et al., to control feedback signals, actually defeats the usefulness of such a control system. Implementing such a system would require serialization circuits located within each unit containing a sensor, and a transmission line from each circuit to the power source or some other control unit. This would not "lead[] to a reduction in parts and more mobile use by the operator." To the contrary, it would seem to actually increase parts and complexity. Therefore, the Examiner's reasoning why it would be obvious to modify Donnart et al. to use a single link does not satisfy MPEP §2142.

Brunner et al., on the other hand, is directed to a welder -- not a plasma torch. The welder of Brunner et al. and the plasma cutter of claim 1 have different purposes and are fundamentally different apparatus. The Examiner did not proffer any reason why these references of distinct art should be combined. The present invention is specifically directed to plasma cutting. One of ordinary skill in the art would recognize that plasma cutting and welding, in the context of the invention, are distinct fields of invention and not readily combinable. "It is the duty of the examiner to explain why the combination of the teachings is proper. MPEP §2142; Ex parte Skinner, 2 USPQ2d 1788 (Bd. Pat. App. & Inter. 1986). Further, "either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." MPEP §2142; Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). Because of the inapplicability of Brunner et al., the fundamental differences between welding and plasma cutting, and the absence of a reason to modify a plasma cutter with a welding system, the current rejection is respectfully believed unsustainable under MPEP §2142.

Furthermore, Brunner et al. does not teach or suggest every element of claim 1, nor is there any suggestion to modify Donnart et al. to satisfy claim 1, as the Examiner has done. First, Brunner et al. does not teach or suggest serialized communication between a torch and a power source. Rather, Brunner et al. teaches serialized communication between (1) the "remote control unit," and (2) a unit called the "welding unit," to control (3) the welding torch. Next, the serialization circuit of the Brunner et al. system is disposed within the remote control unit. This is wholly contradictory to the express elements of claim 1 which call for a serialization circuit in the torch itself to control feedback signals from the torch to the power supply. Also, in column 1, lines 54-57, Brunner et al. explicitly states that its objective is to set values in a welding unit (the power source apparatus) from a remote unit. Applicant's invention contemplates remotely controlling the plasma torch from the power source apparatus -- not remotely controlling the power source apparatus from some other unit. Thus, the combination of Donnart et al. and Brunner et al. does not teach or suggest every element of claim 1.

Due to the existence of another apparatus (the remote control unit), Applicant does not believe that the Examiner's proposed modification of Brunner et al. "leads to a reduction in parts and more mobile use by the operator." Figure 1 of the Brunner et al. system includes an apparatus for controlling the torch which is physically independent of the torch. The existence of the remote control unit also entails more wires to interconnect it with the power source and the torch. Therefore, via the teachings of Brunner et al., a "reduction in parts and more mobile use by the operator" cannot be said to make obvious any modification of Donnart et al. to satisfy claim 1.

Accordingly, Applicant believes that claim 1 is patentably distinguishable from the art of record. Therefore, claims 5, 6, 9, and 10 are also in condition for allowance at least pursuant to the chain of dependency.

The Examiner next rejected claims 2-4, and 11-22 under 35 U.S.C. 103(a) as being unpatentable over a three-way combination of Donnart et al., in view of Brunner et al., and further in view of Schutz. However, regarding claims 11, 15, and 19, the Examiner did not provide a line of reasoning, pursuant to MPEP §2142, to support why it would be obvious to combine three such references, all being of different art. The three references regard unrelated and distinct art, specifically, plasma cutting, welding, and thermal coating. One of ordinary skill in the art would not find it obvious to combine these unrelated references in the context of this invention, or stray from plasma cutting into the arts of welding or thermal coating for modification to a "plasma torch."

Regarding claim 11, the Examiner stated that "[t]he patent to Schutz is applied for teaching sensors located in the torch itself which then communicate[] with the control system, as claimed." Applicant respectfully disagrees, and believes that Schutz does not teach or suggest that sensors be disposed within a torch or any similar apparatus. On the contrary, Schutz is inapplicable to claim 11 because (1) it teaches a thermal coating apparatus -- not a plasma torch, (2) it teaches sensors located outside the coating apparatus and not within a plasma torch, and (3) it teaches a serial connection between a monitoring apparatus and a PC -- not between a plasma torch and a power source.

Schutz is non-analogous art to the plasma torch of the claimed invention. Plasma cutting is a unique process, and plasma cutting torches and their respective control systems are unique to plasma systems. Since the system of Schutz is not configured for plasma cutting, but for an entirely unrelated and non-analogous art of thermal coating, Schutz is not applicable and unrelated to claim 11. In light of the fundamental dissimilarities between thermal coating and plasma cutting, and the lack of motivation proffered for a three-way combination among (1) a welder, (2) a plasma torch, and (3) a thermal coating apparatus, the rejection based on Schutz is not sustainable.

Furthermore, even if the thermal coating apparatus was viewed as sufficiently analogous to a plasma cutter, the sensors of the Schutz system are disposed outside the thermal coating apparatus. Fig. 1 clearly shows the thermal coating apparatus 17 and the monitoring apparatus 1 as being physically distinct from one another. Also, Schutz explicitly mentions the two apparatus as being separate: "thermal coating apparatus 17 together with an embodiment of the apparatus 1 for monitoring the coating process." Col. 4, lns. 33-34. The sensors 3a discussed throughout Schutz are located within the monitoring apparatus, and not the thermal coating apparatus. Thus, Schutz does not teach "sensors located in the torch itself which then communicate[] with the control system," as asserted by the Examiner, and cannot be modified to the contrary by Donnart et al. or Brunner et al.

Donnart et al. and Brunner et al. also do not teach or suggest the placement of multiple sensors within a plasma torch. The only detectors, 31 and 40, in Brunner et al. are located within the welding unit and the remote control unit respectively. The sensors in Donnart et al. are similarly located outside of the torch. Figure 2 clearly shows current sensor 40 and voltage sensors 39 located outside the torch 1. Donnart et al. also contemplates monitoring of the outside environment temperature, a level sensor to detect leaks in the water tank, a water resistivity sensor monitoring the water coolant, and a pressure sensor to monitor the cooling system. These

functions appear to necessarily require the sensors to be located outside the torch, and the sensors are thus shown as being disposed outside the plasma cutter apparatus. Therefore, none of the Examiner's citations suggest modification to, or teach, a control system with a plurality of sensors disposed within a plasma cutter to satisfy claim 11.

Also, claim 11 specifically calls for the sending of sensor feedback from a plasma torch to a power source. However, the only feedback connection mentioned in Schutz is between the monitoring apparatus and a PC, instead of a torch and a power source.

Claim 11 also specifically calls for arranging the feedback of the plurality of sensors into a queue. Schutz never mentions a queue into which the signals from the sensors would be placed prior to sending them to a power source or other recipient. Thus Schutz does not teach all the limitations of claim 11.

Claim 15 calls for a plasma torch assembly comprising a plasma torch, a plurality of sensors within the torch body, and a serializer within the torch body to transmit the sensor feedback to a remote processing unit via a single link. Schutz is again inapplicable because (1) it teaches a thermal coating apparatus – not a plasma cutter, (2) its sensors are located outside the coating apparatus -- not within the torch body, and (3) it teaches a serial connection between the monitoring apparatus and a PC -- not between a torch and a processing unit.

As previously stated, plasma cutting is a unique process, and since the system of Schutz is not configured for plasma cutting, it is not applicable to claim 15. Furthermore, the sensors of Schutz have been shown to be disposed outside the thermal coating apparatus. As noted above, Schutz does not teach "sensors located in the torch itself which then communicate[] with the control system," as asserted by the Examiner, and cannot be modified by Donnart et al. or Brunner et al. to the contrary. Also, the only serial connection mentioned in Schutz is between the monitoring apparatus and a PC instead of a torch and a processing unit, contrary to claim 15. Additionally, Donnart et al. and Brunner et al. do not teach the placement of multiple sensors within a plasma torch. Therefore, none of the Examiner's citations suggest modification to, or teach, a serialized or other control system with a plurality of sensors disposed within a plasma cutter.

Claim 19 calls for a method of manufacturing a plasma cutter comprising the construction of a plasma torch, the disposition of a plurality of sensors within the torch housing, and the connection of the sensors to a serializing circuit which queues the feedback before transmission to a power source. Schutz is again inapplicable because (1) it teaches a thermal coating apparatus, (2) its sensors are located outside the coating apparatus, (3) it teaches a serial

connection between the monitoring apparatus and a PC, and (4) it does not teach a queue into which the feedback is arranged.

As noted above, Schutz does not teach "sensors located in the torch itself which then communicate[] with the control system," as asserted by the Examiner, and cannot be modified by Donnart et al. or Brunner et al. to the contrary. Also, the only serial connection mentioned in Schutz is between the monitoring apparatus and a PC, instead of a torch and a power source, contrary to claim 19. Schutz never mentions a queue into which the signals from the sensors would be placed prior to sending them to a power source or other recipient. Claim 11 specifically calls for arranging the feedback of the plurality of sensors into a queue. Additionally, Donnart et al. and Brunner et al. do not teach the placement of multiple sensors within a plasma torch. Therefore, none of the Examiner's citations suggest modification to, or teach, a serialized or other control system with a plurality of sensors disposed within a plasma cutter.

The lack of support or reasoning for a three-way combination of (1) a welder, (2) a plasma torch, and (3) a thermal coating apparatus, in the context of this invention, is believed evidence that the three are distinct and not readily combinable for an improvement to a "plasma torch." Due to the differences in the art, and the fact that Schutz does not teach each and every element of claim 19, Applicant believes that claim 19 is not obvious in light of the cited references.

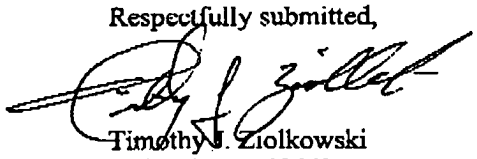
The Examiner's statement that "the use of particular sensors in the torch is an obvious design choice," because Schutz teaches "sensors located in the torch itself" is not supported by the references. Contrary to this proffered basis of rejection, Applicant believes that the prior art does not teach a plurality of "sensors located in the torch itself," and that claims 11, 15, and 19 are each in condition for allowance as such is more than a mere "design choice."

Thus, the serialized system to control transmission of multiple feedback signals from a plasma torch to a power source, as called for in claims 1, 11, 15, and 19, is neither taught nor suggested by any combination of Donnart et al., Brunner et al., or Schutz. Applicant therefore believes that claims 1, 11, 15, and 19, and those claims that depend therefrom, are patentably distinct from the art of record and are in condition for allowance.

Therefore, in light of at least the foregoing, Applicant respectfully believes that the present application is in condition for allowance. As a result, Applicant respectfully requests timely issuance of a Notice of Allowance for claims 1-22.

Applicant appreciates the Examiner's consideration of these Remarks and cordially invites the Examiner to call the undersigned, should the Examiner consider any matters unresolved.

Respectfully submitted,



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